

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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International Patent Classification (IPC) or national classification and IPC Int. Cl.⁷ B64C 27/08, 27/28, 27/52, 29/00		
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1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.	
2. This REPORT consists of a total of 3 sheets, including this cover sheet.	
<input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).	
These annexes consist of a total of 16 sheet(s).	
3. This report contains indications relating to the following items:	
I	<input checked="" type="checkbox"/> Basis of the report
II	<input type="checkbox"/> Priority
III	<input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	<input type="checkbox"/> Lack of unity of invention
V	<input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	<input type="checkbox"/> Certain documents cited
VII	<input type="checkbox"/> Certain defects in the international application
VIII	<input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 4 December 2003	Date of completion of the report 5 April 2004
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I. Basis of the report**1. With regard to the elements of the international application:***☐ the international application as originally filed.☒ the description, pages **1-25** , as originally filed,

pages , filed with the demand,

pages , received on with the letter of

☒ the claims, pages **29-30, 33, 36-37, 40, 43, 46-47, 50, 53-63** as originally filed,

pages , as amended (together with any statement) under Article 19,

pages , filed with the demand,

pages **27-28, 31-32, 34-35, 38-39, 41-42, 44-45, 48-49, 51-52**, received on **12 March 2004**with the letter of **12 March 2004**☒ the drawings, pages **1/10-10/10**, as originally filed,

pages , filed with the demand,

pages , received on with the letter of

☐ the sequence listing part of the description:

pages , as originally filed

pages , filed with the demand

pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in written form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished**4. ☐ The amendments have resulted in the cancellation of:**☐ the description, pages☐ the claims, Nos.☐ the drawings, sheets/fig.**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-48	YES
	Claims	NO
Inventive step (IS)	Claims 1-48	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-48	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The invention of the amended claims is an aircraft having tandemly arranged lifting means so connected to the aircraft that each lifting means can be controlled so as to tilt in forward, rearward and lateral directions. In particular the tilting of the lifting means can be controlled so that each lifting means can tilt laterally (of the aircraft) in the opposite direction to the other so as to control the direction of travel of the aircraft.

No individual citation or obvious combination of citations discloses an aircraft with the above features.

The closest art, that of US 3905565 A and US 2233747 A, disclose aircraft which, although steerable by opposite lateral tilting of tandem rotors, do not have rotors which are free to be tilted in other directions.

What I claim as my invention is:

1. An aircraft with a main body, a primary lifting mechanism and a secondary lifting mechanism, which main body has a forward end and an aft end, with the primary lifting mechanism and the secondary lifting mechanism connected to the main body of the aircraft in tandem order, and with the aircraft able to achieve flight by means of upward forces exerted on the main body of the aircraft by the primary lifting mechanism and the secondary lifting mechanism while the primary lifting mechanism and the secondary lifting mechanism are connected to the main body of the aircraft in tandem order,
and which primary lifting mechanism comprises a power plant as a means for providing downwardly extending thrust to the aircraft, and which secondary lifting mechanism comprises a power plant as a means for providing downwardly extending thrust to the aircraft, and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of

travel of the aircraft during flight can be altered by
altering the lateral direction or angle of tilt of the primary
lifting mechanism relative to the main body of the aircraft,
and which said tilt enabling joint is a primary tilt enabling
5 joint, with the primary lifting mechanism able to exert an
upward force on the forward end of the main body of the
aircraft through the primary tilt enabling joint, and which
secondary lifting mechanism is connected to the main body of
the aircraft by an additional tilt enabling joint, which said
10 additional tilt enabling joint is a secondary tilt enabling
joint, and which said secondary lifting mechanism is
connected to the main body of the aircraft by the secondary
tilt enabling joint such that during flight of the aircraft
the secondary lifting mechanism can be tilted in a plurality
15 of directions and angles relative to the main body of the
aircraft, in a controlled manner, and such that the secondary
lifting mechanism can be tilted in forward, rearward and
lateral directions relative to the main body during flight
of the aircraft, in a controlled manner, and
20 such that a direction of travel of the aircraft during
flight can be altered by altering the lateral direction or
angle of tilt of the secondary lifting mechanism relative
to the main body, and which secondary tilt enabling joint is
such that the secondary lifting mechanism can be tilted in a
25 controlled manner in a lateral direction with respect to the
main body of the aircraft during flight of the aircraft that

blades, with the blades of the secondary lifting
mechanism connected to the rotor of the secondary
lifting mechanism, and which engine assembly of
the secondary lifting mechanism is able to rotate
5 the rotor of the secondary lifting mechanism,
with the blades of the secondary lifting mechanism
connected to the rotor of the secondary lifting
mechanism such that when the rotor of the secondary
lifting mechanism is rotated by the engine assembly
10 of the secondary lifting mechanism air can be forced
in a downward direction by means of the blades of the
secondary lifting mechanism rotating around the rotor
of the secondary lifting mechanism, with the secondary
lifting mechanism able to exert an upward force on
15 the aft end of the main body of the aircraft by
forcing air in a downward direction by way of the
blades of the secondary lifting mechanism rotating
around the rotor of the secondary lifting mechanism,
and which primary lifting mechanism is connected to the
20 main body of the aircraft by a tilt enabling joint such that
during flight of the aircraft the primary lifting mechanism
can be tilted in a plurality of directions and angles relative
to the main body of the aircraft, in a controlled manner, and
such that the primary lifting mechanism can be tilted in
25 forward, rearward and lateral directions relative to the main
body of the aircraft

during flight of the aircraft, in a controlled manner,
and such that a direction of
travel of the aircraft during flight can be altered by
altering the lateral direction or angle of tilt of the primary
5 lifting mechanism relative to the main body of the aircraft,
and which said tilt enabling joint is a primary tilt enabling
joint, with the primary lifting mechanism able to exert an
upward force on the forward end of the main body of the
aircraft through the primary tilt enabling joint, and which
10 secondary lifting mechanism is connected to the main body of
the aircraft by an additional tilt enabling joint, which said
additional tilt enabling joint is a secondary tilt enabling
joint, and which said secondary lifting mechanism is
connected to the main body of the aircraft by the secondary
15 tilt enabling joint such that during flight of the aircraft
the secondary lifting mechanism can be tilted in a plurality
of directions and angles relative to the main body of the
aircraft, in a controlled manner, and such that the secondary
lifting mechanism can be tilted in forward, rearward and
20 lateral directions relative to the main body during flight
of the aircraft, in a controlled manner, and
such that a direction of travel of the aircraft during
flight can be altered by altering the lateral direction or
angle of tilt of the secondary lifting mechanism relative
25 to the main body, and which secondary tilt enabling joint is
such that the secondary lifting mechanism can be tilted in a
controlled manner in a lateral direction with respect to the

3. An aircraft with a main body, a primary lifting mechanism and a secondary lifting mechanism, which main body has a forward end and an aft end, with the primary lifting mechanism and the secondary lifting mechanism connected to the main body of the aircraft in tandem order, and with the aircraft able to achieve flight by means of upward forces exerted on the main body of the aircraft by the primary lifting mechanism and the secondary lifting mechanism while the primary lifting mechanism and the secondary lifting mechanism are connected to the main body of the aircraft in tandem order, and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the primary lifting mechanism relative to the main body of the aircraft, and which said tilt enabling joint is a primary tilt enabling joint,

which primary lifting
mechanism is a turboprop, and which primary lifting
mechanism is attached to the primary tilt enabling joint
such that air can be forced in a downward direction
5 by the primary lifting mechanism, and such that by forcing
air in a downward direction the primary lifting mechanism is
able to exert an upward force on the forward end of the
main body of the aircraft, with the primary lifting mechanism
able to exert an upward force on the forward end of the main
10 body of the aircraft through the primary tilt enabling joint,
and which secondary lifting mechanism is connected to the
main body of the aircraft by an additional tilt enabling joint,
which said additional tilt enabling joint is a secondary tilt
enabling joint, and which said secondary lifting mechanism is
15 connected to the main body of the aircraft by the secondary
tilt enabling joint such that during flight of the aircraft
the secondary lifting mechanism can be tilted in a plurality
of directions and angles relative to the main body of the
aircraft, in a controlled manner, and such that the secondary
20 lifting mechanism can be tilted in forward, rearward and
lateral directions relative to the main body during flight
of the aircraft, in a controlled manner, and
such that a direction of travel of the aircraft during
flight can be altered by altering the lateral direction or
25 angle of tilt of the secondary lifting mechanism relative
to the main body, and which secondary tilt enabling joint is

downward direction by means of the blades rotating
around the rotor, with the primary lifting mechanism
able to exert an upward force on the forward end of
the main body of the aircraft by forcing air in a
5 downward direction by way of the blades rotating
around the rotor,

and which primary lifting mechanism is connected to the
main body of the aircraft by a tilt enabling joint such that
during flight of the aircraft the primary lifting mechanism
10 can be tilted in a plurality of directions and angles relative
to the main body of the aircraft, in a controlled manner, and
such that the primary lifting mechanism can be tilted in
forward, rearward and lateral directions relative to the
main body of the aircraft during flight of the aircraft,
15 in a controlled manner, and such that a direction of
travel of the aircraft during flight can be altered by
altering the lateral direction or angle of tilt of the primary
lifting mechanism relative to the main body of the aircraft,
and which said tilt enabling joint is a primary tilt enabling
20 joint, with the primary lifting mechanism able to exert an
upward force on the forward end of the main body of the
aircraft through the primary tilt enabling joint, and which
secondary lifting mechanism is connected to the main body of
the aircraft by an additional tilt enabling joint, which said
25 additional tilt enabling joint is a secondary tilt enabling
joint, and which said secondary lifting mechanism is

connected to the main body of the aircraft by the secondary tilt enabling joint such that during flight of the aircraft the secondary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the secondary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the secondary lifting mechanism relative to the main body, and which secondary tilt enabling joint is such that the secondary lifting mechanism can be tilted in a controlled manner in a lateral direction with respect to the main body of the aircraft during flight of the aircraft that is opposite to a lateral direction that the primary lifting mechanism can be tilted in with respect to the main body of the aircraft by means of the primary tilt enabling joint during flight of the aircraft,

and the secondary lifting mechanism comprises at least one jet engine, which said at least one jet engine is attached to the secondary tilt enabling joint such that the said at least one jet engine is able to force exhaust gases to travel in a downward direction and such that by forcing exhaust gases to travel in a downward direction the said at least one jet engine can

7. An aircraft with a main body, a primary lifting mechanism and a secondary lifting mechanism, which main body has a forward end and an aft end, with the primary lifting mechanism and the secondary lifting mechanism connected to the main body of the aircraft in tandem order, and with the aircraft able to achieve flight by means of upward forces exerted on the main body of the aircraft by the primary lifting mechanism and the secondary lifting mechanism while the primary lifting mechanism and the secondary lifting mechanism are connected to the main body of the aircraft in tandem order,

and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the primary lifting mechanism relative to the main body of the aircraft, and which said tilt enabling joint is a primary tilt enabling joint, with the primary lifting mechanism able to exert an upward force on the forward end of the main body of the aircraft through the primary tilt enabling joint, and which

secondary lifting mechanism is connected to the main body of the aircraft by an additional tilt enabling joint, which said additional tilt enabling joint is a secondary tilt enabling joint, and which said secondary lifting mechanism is

5 connected to the main body of the aircraft by the secondary tilt enabling joint such that during flight of the aircraft the secondary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the secondary

10 lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or

15 angle of tilt of the secondary lifting mechanism relative to the main body, and which secondary tilt enabling joint is such that the secondary lifting mechanism can be tilted in a controlled manner in a lateral direction with respect to the main body of the aircraft during flight of the aircraft that

20 is opposite to a lateral direction that the primary lifting mechanism can be tilted in with respect to the main body of the aircraft by means of the primary tilt enabling joint during flight of the aircraft, and which secondary lifting mechanism is able to exert an upward force on the aft end

25 of the main body of the aircraft through the secondary tilt enabling joint, with the primary tilt enabling joint and the

8. An aircraft with a main body, a primary lifting mechanism and a secondary lifting mechanism, which main body has a forward end and an aft end, with the primary lifting mechanism and the secondary lifting mechanism connected to the main body of the aircraft in tandem order, and with the aircraft able to achieve flight by means of upward forces exerted on the main body of the aircraft by the primary lifting mechanism and the secondary lifting mechanism while the primary lifting mechanism and the secondary lifting mechanism are connected to the main body of the aircraft in tandem order,
- and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the primary lifting mechanism relative to the main body of the aircraft, and which said tilt enabling joint is a primary tilt enabling joint,
- which primary lifting mechanism is a turboprop, and which primary lifting

mechanism is attached to the primary tilt enabling joint
such that air can be forced in a downward direction by the
primary lifting mechanism, and such that by forcing air in
a downward direction the primary lifting mechanism is able
5 to exert an upward force on the forward end of the
main body of the aircraft, with the primary lifting
mechanism able to exert an upward force on the forward end
of the main body of the aircraft through the primary tilt
enabling joint,

10 and which secondary lifting mechanism is connected to
the main body of the aircraft by an additional tilt
enabling joint, which said additional tilt enabling
joint is a secondary tilt enabling joint, and which said
secondary lifting mechanism is connected to the main body
15 of the aircraft by the secondary tilt enabling joint such
that during flight of the aircraft the secondary lifting
mechanism can be tilted in a plurality
of directions and angles relative to the main body of the
aircraft, in a controlled manner, and such that the secondary
20 lifting mechanism can be tilted in forward, rearward and
lateral directions relative to the main body during flight
of the aircraft, in a controlled manner, and
such that a direction of travel of the aircraft during
flight can be altered by altering the lateral direction or
25 angle of tilt of the secondary lifting mechanism relative
to the main body, and which secondary tilt enabling joint is

plurality of blades, with the said blades connected to the rotor, and which said engine assembly is able to rotate the said rotor, with the blades connected to the rotor such that when the rotor is rotated by the said engine assembly
5 air can be forced in a downward direction by means of the blades rotating around the rotor, with the primary lifting mechanism able to exert an upward force on the forward end of the main body of the aircraft by forcing air in a downward direction by way of the blades rotating
10 around the rotor,
and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative
15 to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of
20 travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the primary lifting mechanism relative to the main body of the aircraft, and which said tilt enabling joint is a primary tilt enabling joint, with the primary lifting mechanism able to exert an
25 upward force on the forward end of the main body of the aircraft through the primary tilt enabling joint, and which

secondary lifting mechanism is connected to the main body of the aircraft by an additional tilt enabling joint, which said additional tilt enabling joint is a secondary tilt enabling joint, and which said secondary lifting mechanism is

5 connected to the main body of the aircraft by the secondary tilt enabling joint such that during flight of the aircraft the secondary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the secondary

10 lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or

15 angle of tilt of the secondary lifting mechanism relative to the main body, and which secondary tilt enabling joint is such that the secondary lifting mechanism can be tilted in a controlled manner in a lateral direction with respect to the main body of the aircraft during flight of the aircraft that

20 is opposite to a lateral direction that the primary lifting mechanism can be tilted in with respect to the main body of the aircraft by means of the primary tilt enabling joint during flight of the aircraft,

and the secondary lifting

25 mechanism is a turboprop, which secondary lifting mechanism is attached to the secondary tilt enabling joint such

12. An aircraft with a main body, a primary lifting mechanism and a secondary lifting mechanism, which main body has a forward end and an aft end, with the primary lifting mechanism and the secondary lifting mechanism connected to the main body of the aircraft in tandem order, and with the aircraft able to achieve flight by means of upward forces exerted on the main body of the aircraft by the primary lifting mechanism and the secondary lifting mechanism while the primary lifting mechanism and the secondary lifting mechanism are connected to the main body of the aircraft in tandem order,
- and which primary lifting mechanism is connected to the main body of the aircraft by a tilt enabling joint such that during flight of the aircraft the primary lifting mechanism can be tilted in a plurality of directions and angles relative to the main body of the aircraft, in a controlled manner, and such that the primary lifting mechanism can be tilted in forward, rearward and lateral directions relative to the main body of the aircraft during flight of the aircraft, in a controlled manner, and such that a direction of travel of the aircraft during flight can be altered by altering the lateral direction or angle of tilt of the primary lifting mechanism relative to the main body of the aircraft, and which said tilt enabling joint is a primary tilt enabling joint,
- which primary lifting mechanism is a turboprop, and which primary lifting mechanism is

attached to the primary tilt enabling joint such that air
can be forced in a downward direction by the primary
lifting mechanism, and such that by forcing air in a
downward direction the primary lifting mechanism is able
5 to exert an upward force on the forward end of the main
body of the aircraft, with the primary lifting mechanism
able to exert an upward force on the forward end of the main
body of the aircraft through the primary tilt enabling joint,
and which secondary lifting mechanism is
10 connected to the main body of the aircraft by an additional
tilt enabling joint, which said additional tilt enabling
joint is a secondary tilt enabling
joint, and which said secondary lifting mechanism is
connected to the main body of the aircraft by the secondary
15 tilt enabling joint such that during flight of the aircraft
the secondary lifting mechanism can be tilted in a plurality
of directions and angles relative to the main body of the
aircraft, in a controlled manner, and such that the secondary
lifting mechanism can be tilted in forward, rearward and
20 lateral directions relative to the main body during flight
of the aircraft, in a controlled manner, and
such that a direction of travel of the aircraft during
flight can be altered by altering the lateral direction or
angle of tilt of the secondary lifting mechanism relative
25 to the main body, and which secondary tilt enabling joint is
such that the secondary lifting mechanism can be tilted in a